

CLAIMS

1. Method for producing oligosaccharides, comprising the steps of:

a) selecting a gene which codes for an enzyme which is capable of converting sucrose into an oligosaccharide;

5 b) linking the gene to suitable transcription-initiation and transcription-termination signals in order to provide an expression construct;

c) transforming a suitable plant cell with the expression construct;

10 d) regenerating a transgenic plant from the transformed plant cell;

e) culturing the transgenic plant under conditions enabling the expression and activity of the enzyme; and

15 f) isolating the oligosaccharides from the transgenic plant.

2. Method as claimed in claim 1, characterized in that the gene which codes for an enzyme which is capable of converting sucrose into an oligosaccharide is of microbial origin.

20 3. Method as claimed in claim 2, characterized in that the gene which codes for an enzyme which is capable of converting sucrose into an oligosaccharide is the ftf gene of Streptococcus mutans or a mutated version thereof.

25 4. Method as claimed in claim 2, characterized in that the gene which codes for an enzyme which is capable of converting sucrose into an oligosaccharide is the SacB gene of Bacillus subtilis or a mutated version thereof.

30 5. Method as claimed in claim 1, characterized in that the gene which codes for an enzyme which is capable of converting sucrose into an oligosaccharide is of vegetable origin.

35 6. Method as claimed in claim 5, characterized in that the gene which codes for an enzyme which is capable of converting sucrose into an oligosaccharide is the sucrose-sucrose-fructosyltransferase (SST) gene of the onion or a mutated version thereof.

7. Method as claimed in claim 5, characterized in that the gene which codes for an enzyme which is capable of converting sucrose into an oligosaccharide is the sucrose-fructan 6-fructosyltransferase (6-SFT) gene from Hordeum vulgare L. or a mutated version thereof.

8. Method as claimed in claim 5, characterized in that the gene which codes for an enzyme which is capable of converting sucrose into an oligosaccharide is the fructan-fructan-fructosyltransferase (FFT) gene from Helianthus tuberosus or a mutated version thereof.

9. Method as claimed in any of the foregoing claims, characterized in that the expression construct further comprises at least one targeting signal sequence.

10. Method as claimed in any of the foregoing claims, characterized in that the expression construct further comprises at least one enhancer.

11. Oligosaccharides to be obtained by transforming a plant cell with a gene which codes for an enzyme which is capable of converting sucrose into an oligosaccharide; regenerating a transgenic plant from the transformed plant cell; culturing the transgenic plant under conditions enabling the expression and activity of the enzyme; and isolating the oligosaccharides from the transgenic plant.

12. Oligosaccharides as claimed in claim 11, characterized by the general formula G_mF_n , wherein G represents glucose and F fructose and wherein m equals 0 or 1 and n is an integer greater than or equal to 0, m preferably equals 1 and n varies from 2 to 8, n preferably equals 2 or 3.

13. Mixture of oligosaccharides, wherein the chain length of the individual molecules lies substantially between 2 and 8, to be obtained by means of the method as claimed in any of the claims 1-10.

14. DNA-construct for expressing an enzyme capable of converting sucrose into an oligosaccharide in a plant or plant cell, comprising a gene which codes for the enzyme, coupled in reading frame to plant-specific transcription-initiation and termination signals.

15. Transgenic plant cell, comprising the DNA-construct as claimed in claim 14.

16. Transgenic plant, to be produced by regeneration from a transgenic plant cell as claimed in claim 15.

5 17. Transgenic plant tissue originating from a plant as claimed in claim 16 or to be produced by regeneration from a transgenic plant cell as claimed in claim 15.

18. Use of the oligosaccharides as claimed in claim 11 or 12 and/or the mixture of oligosaccharides as claimed in 10 claim 13 as sugar substitute in food products.

19. Use of the oligosaccharide as claimed in claim 11 or 12 and/or the mixture of oligosaccharides as claimed in claim 13 as nutritional fibre in food products.

20. Use of the oligosaccharide as claimed in claim 11 15 or 12 and/or the mixture of oligosaccharides as claimed in claim 13 as bifidogenic agent in food products.

21. Use of the oligosaccharide as claimed in claim 11 or 12 and/or the mixture of oligosaccharides as claimed in claim 13 as bifidogenic agent in animal feed.